Proceedings of the Iowa Academy of Science

Volume 74 | Annual Issue Article 39

1967

Underwater Photography of Fish Found on the Coral Reefs of Jamaica

Edward Charles Laird
Buena Vista College

Underwater Photography of Fish Found on the Coral Reefs of Jamaica[1]

BY EDWARD CHARLES LAIRD [2]

Abstract. Techniques are described for photographing fish under water at the Caribbean Biological Center near Ocho Rios, Jamaica. F-numbers 5.6 and 8 with shutter speed of 1/125 at a distance of 3 feet yielded the best photographs.

The purpose of this study was to compile data regarding the underwater photography of fish.

LOCATION AND DESCRIPTION OF STUDY SITE

The period from March 18, 1967, to April 2, 1967, was spent at the Caribbean Biological Center adjoining the Hotel Sans Souci three miles east of Ocho Rios, Jamaica. The coral reef occurring in this vicinity is of the same characteristic order as the reef at Ocho Rios Bay described by Thomas F. Goreau (1959). Nearly all of the photography was done in the rear zone of the reef and the thallasia or turtle-grass meadows of the lagoon. The depth of the water in these zones ranged anywhere from one to seven meters.

DIVING TECHNIQUE AND APPARATUS

Since most of the photography was confined to depths of two to three meters, aqua lungs were not absolutely necessary. Snorkeling and free diving served sufficiently. Personal diving gear consisted of the following:

1. "Boot or shoe" type swim fins.
2. A face mask which also covered the nose to facilitate the equalization of air pressure in the Eustachian tubes.
3. J-tube snorkel.
4. A heavy plastic glove to permit grasping of the coral without the inconvenience of abrasions and cuts, or exposure to the nematocysts of the corals and anemones.

A small, inflatable, one-man raft was towed along to carry extra rolls of film in plastic bags and to permit reloading the camera without having to go ashore. About ten to twelve meters of rope attaching the skin diver to the raft allowed sufficient slack for free diving so as not to be hampered by the buoyancy of the raft.

TECHNIQUE OF APPROACHING THE FISH

Working within such a close proximity of the fish and obtaining desirable views or poses presented limited difficulty. When

[1] Independent Study 199 supervised by Ronald E. Smith, Biology Department, Buena Vista College, Storm Lake, Iowa.
[2] Buena Vista College, Storm Lake, Iowa.

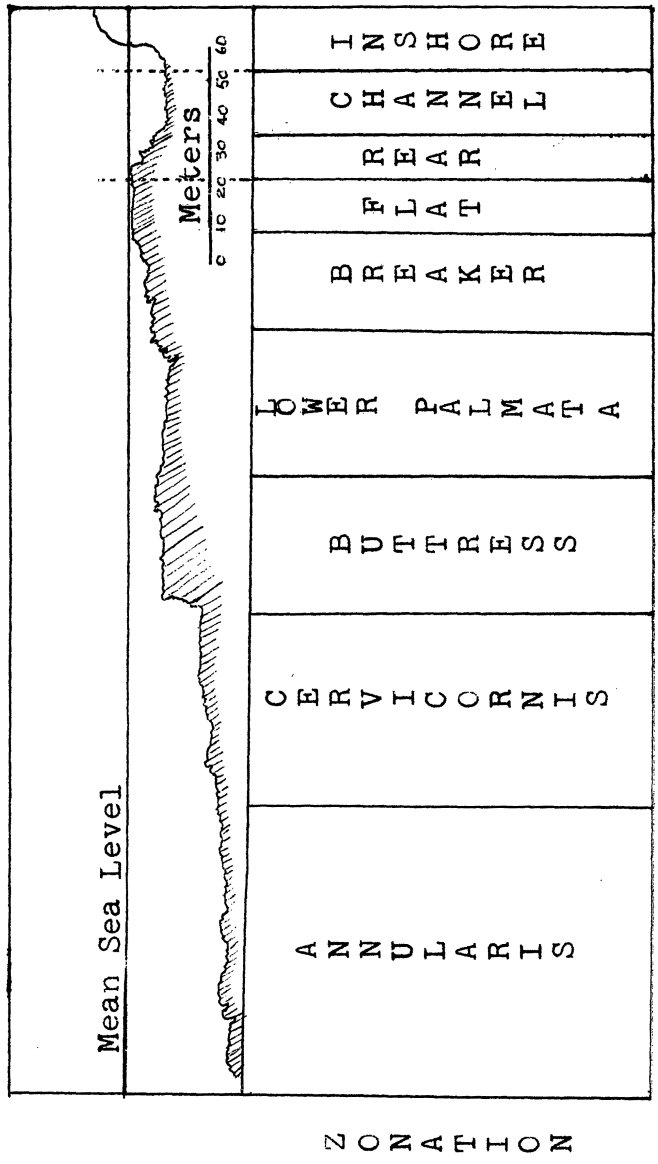

Figure 1. Cross Section of reef to show area of study.

the diver first snorkeled over an area, the fish would dart into pockets in the coral or swim away; but when he floated motionless on the surface for several minutes, the fishes first escape reaction subsided and they became intensely curious. After approximately ten or fifteen minutes the fish seemed to ignore the presence of a skin diver and reverted to the normal activities of feeding and territorial maintenance. Free diving down directly on top of the fish seemed to frighten them somewhat and in this manner they could not be approached any closer than one and one-half to three meters. By diving to the bottom and then approaching the fish in a horizontal attitude, the diver could approach the fish to within a half meter. Approaching the fish from a horizontal level also produced better poses, especially for lateral or side views and likewise yielded better background for color contrast. Diving from above produced only dorsal and caudal views.

Photographic Technique and Apparatus

The camera employed for this study was Nikonos Underwater with the following specifications:

1. Dimensions—3.8 inches (99 mm) in height x 4.9 inches (125 mm) in width x 2.7 inches in depth
2. Weight—25 ounces (700 g)
3. Lens—W-Nikkor F = 35 mm F/2.5
4. F-Numbers—2.5, 4, 5.6, 8, 11, 16, 22
5. Shutter speeds—B, 1/30, 1/60, 1/125, 1/250, 1/250 second
6. Shutter—Focal—Plane type with vertically moving duralumin curtains
7. Film—35 mm cartridge
8. Picture size—24 x 36 mm
9. Closest focus distance—2.75 feet (0.8m) in air

Kodak, high-speed, Ektachrome color film was used with an ASA number of 160. A CC3OR 52 mm filter was used to avoid a blue tinge since more red color is absorbed as the depth increases. A wax bottom disecting pan was used as a tablet with a probe stylus to record sufficient data about each exposure.

For the short duration of this study, the light intensity was nearly constant owing to the relatively cloudless sky. All work was done between 10 a.m. and 3 p.m. to take advantage of the greatest light penetration.

Light meter readings were taken before the water was entered. F/22-1/60 and F/16-1/125 were nearly always the readings obtained. After the diver entered the water, the aperture was opened three F-numbers yielding F/8 and F/5.6. The aperture was opened an additional F-number for each three meters in depth. Shutter speeds varied from 1/30 to 1/60 to 1/125 second.

With the F-numbers and shutter speeds determined, the focal distance became critical. As the refractive index of water is approximately 1.33, objects seen under water appear three-fourths of their actual distance away. If the distance of the subject was measured underwater, the distance set on the scale must be three-fourth of the measured distance. Although the objects were enlarged in proportion, the field of view was reduced. If the distance was not measured, the estimated visual distance was set on the scale.

Results and Conclusions

Conclusions were drawn only after careful examination of the photographs obtained correlated with F-number, shutter speed, focus, depth, attitude of shot and background, and bottom conditions. Conclusions and recommendations are as follows:

1. F-numbers 5.6 and 8 yielded clear shots equally well.
2. Shutter speed 1/125 stopped action while 1/60 and 1/30 were too slow and resulted in blurred and over-exposed pictures.
3. Distance of three feet (1 m approximately) was close enough to obtain the desired detail, while any nearer distance approached the focal limit of the lens and cut down the depth of the field to the extent that it made measurement of distance necessary for correct focus.
4. Horizontal shots yielded better coloration due to the elimination of bottom reflection.
5. Best color contrast occurred when the subject was directly in front of a coral mass.

Literature Cited

Goreau, Thomas F. 1959. The ecology of Jamaican coral reefs. Ecology 40:67-90.

